

## 廣東茂名鱷類化石的新發現

葉 祥 奎

(中國科學院古脊椎動物研究所)

今年(1958)8月,筆者和本所其他兩位同志到廣東茂名金塘工區進行脊椎動物化石調查、採集時,大塘小露天礦的同志將他們過去所發現的好些標本贈與我們;其中除了大多數的龜、魚化石外,還有一個鱷類的頭骨內模。更有意義的是,在這頭骨上還保存着相當完整的腦內模。這樣完整的腦內模,在我國還是很少見的。我們非常感謝小露天礦的同志們將這些珍貴的標本贈與我所研究。

### 標 本 記 述

#### *Tomistoma Müller*

#### *Tomistoma petrolica* Yeh, sp. nov.

正型標本 具有腦子的頭骨內模一個。前端殘缺,鱗骨(squamosal)後緣破損(V2303)。

副型標本 殘破的腦內模一個(V2303a)。

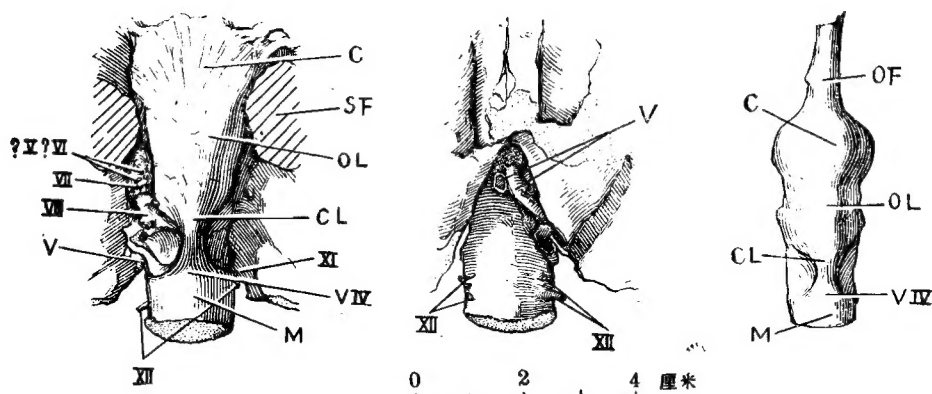


圖1 左和中: *Tomistoma petrolica* Yeh, sp. nov. 正型標本腦內模背視和腹視。(Brain cast of type in dorsal and ventral views).  $\times \frac{1}{2}$ , V2303.  
右: 揚子鱷腦腔內鑄成之腦內模,用以和正型標本對比。(Brain cast made from the brain-case of *Alligator sinensis* for comparison with type).  $\times \frac{1}{2}$ .  
C. 大腦(cerebrum), CL. 小腦(cerebellum), M. 延腦(medulla), OF. 嗅管(olfactory tract), OL. 視葉(optic lobe), SF. 上顳顬孔(supratemporal fenestrae), V. 血管(veins), VIV. 第四腦室(ventricle IV). 羅馬數字代表其相當的各對腦神經(numerals indicate the number of cranial nerves).

產地 廣東茂名金塘工區大塘小露天礦。

層位和時代 茂名系油柑窩層上部;上始新世。

**腦內模** 腦內模除了嗅管 (olfactory tract)、嗅球 (olfactory bulb) 未曾顯露和延腦後部略有破損外,其他部分全都保存。

茂名腦內模標本與現代鱷類新鮮的腦子有着很大的差別<sup>1)</sup>,當然這不能全歸於屬種的差異,更大的原因應該是鑄模的關係,因為新鮮腦子上的許多血竇等構造,是不可能反映在鑄模上來的,從而就會使鑄模形狀與新鮮標本有着一定的差異。為此,筆者曾以現生的 *Alligator sinensis* 的腦腔為標準,做出一個鑄模(圖1,右),這個鑄模就同茂名標本十分相似。這一點,可以肯定茂名標本屬於新鱷類 (eusuchian) 無誤。

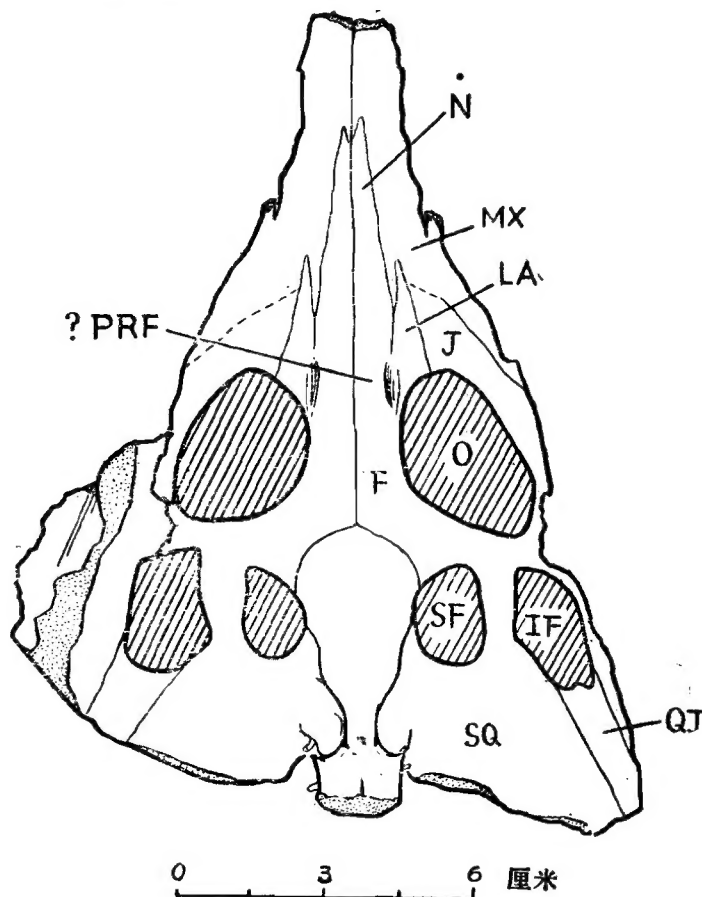


圖2 *Tomistoma petrolica* Yeh, sp. nov. 頭骨內模背面觀,圖中簡字系一般採用者。(skull cast of type in dorsal view).  $\times \frac{2}{3}$ , V2303.

如果將上述兩種腦內模加以仔細對比,則仍不難看出它們之間的差別,諸如 1. *Alligator*

1) 以 Rand, H. W. 1950 "The Chordates" Fig. 370 的幼年 *Alligator* 腦子為對比。

的整個腦形較高；2. *Alligator* 的第四腦室較顯著，而這在我們標本上幾乎看不出來；3. *Alligator* 的大腦與整個腦子長度的比例比茂名標本的為大等。凡此種種，除了說明不同屬種的差異外，似乎還表示化石種比現生種具有更原始的性質。

腦內模的大腦部分看得很清楚，後緣以一微凹的界線與視葉分開，大腦表面上分佈着纖細的向外、向前放射的條紋，這可能是生活時腦子外膜上脈絡紋的印痕。它的視葉小，它與小腦的界線不顯著。小腦前寬後狹，覆蓋在延腦背面。延腦闊扁，後緣斷面呈雙凸透鏡狀，與上述 *Alligator* 的呈亞圓形者不同。在延腦的兩側（尤其是左側），背視可以看到好幾對腦神經的殘幹，由後向前，最先看到的是第十一對腦神經（副神經）的根跡，向前，在小腦覆蓋的左下側可以看到一對較粗的神經幹，這支神經一出腦子不遠即分為上下兩小支。可以肯定，這是第八對腦神經（聽神經）。緊挨聽神經之前，還可看到另一支神經，它可能代表第七對腦神經（顏面神經）。再前，紊亂的還有幾支，但已分辨不清，根據位置看來，應該是第五（三叉神經）或第四（滑車神經）對腦神經（圖 1，左）。

在延腦的腹面，在第十一對腦神經的腹後方，左右都可看到兩根前後並列的神經幹，這是第十二對腦神經（舌下神經）（圖 1，中）。

在腦內模的背兩側以及腹中部和左側，都可看到幾根血管，尤其是腹面中部的那條看得特別清楚，它們比腦神經幹為粗，且是空心的（圖 1，中）。

在副型標本的大腦表面上也有與正型標本上相同的細紋，但大腦的體積較正型標本者為大（圖版 1, 3），可能它代表一個較大或成年的個體而正型標本代表一個較年幼的個體。

2. 頭骨 整個頭骨外形呈長腰的等腰三角形。吻細長；鼻骨也細長，但其前方被左右縫合的上顎骨(?)所阻，故不可能與外鼻孔和前顎骨接觸。上顎骨兩外側還留有牙痕的凹坑，一直後延到眼眶的中前部。眼眶大，卵圓形，前後徑大於左右徑。軛骨(jugal)壯健，由眼眶兩側向內、向前伸延，終止於眼眶的外側前方。上顳顬孔也呈卵圓形，長大於寬，前後長度約為眼眶的 $\frac{1}{2}$ 。側顳顬孔大於上顳顬孔，略呈長方形，前後長，左右狹，起始於上顳顬孔之稍前而終止於上顳顬孔之後。方軛骨(quadratojugal)成狹長的棒狀，前方伸入側顳顬孔（圖版 1 圖 1 及插圖 2）。

#### 標本測量（單位 mm）

吻前端至延腦後端的保存長度·····	163
從最後一個上顎齒痕到保存的吻長·····	80
最後上顎齒痕處的吻寬·····	70
鼻骨前方終止處的吻寬·····	20
沿兩眼眶外緣的頭骨寬度·····	72
眼間距·····	17
兩側顳顬孔間的頭骨寬度·····	93

頭骨腹面保存不佳，骨縫更不清楚；但可肯定腹面的內模是初生體的而非次生體的，該標本可能是在次生體毀壞後鑄成的。奇怪的是在腭部的前方，有兩行成 X 形排列的小齒(?)，每排數約 15，未知是否代表鋤骨齒(vomer teeth)的殘餘?（圖版 1, 圖 2）。

#### 討 論

從以上的特徵看來，茂名標本應該屬於長吻鱷類無誤，但與長吻鱷類的 *Gavialis*、*Tomistoma* 比較起來，仍各有所不同。從兩上顎骨在鼻骨前方縫合而阻止了鼻骨與前顎骨接觸的特徵看

來,應該與 *Gavialis* 相似;但鼻骨細長、眼眶直徑大於橫徑、眼間距小、上顳顬孔小於眼眶且長大於寬等特徵,却又使茂名標本與 *Tomistoma* 相似。所以,茂名標本並有可能代表一個介於上述兩屬之間的新屬。但終因吻部骨縫不清,未能絕對肯定鼻骨、上顎骨與其他骨頭間的關係,故考慮暫且把它歸入特徵最為接近的 *Tomistoma* 屬(此屬在馬來亞、蘇門答臘等地還有現生種),而另訂一新種名 *Tomistoma petrolica*;種名表示此標本產自油頁岩中。

關於出產 *Tomistoma petrolica* 的油柑窩層的時代問題,過去曾有過不同的意見,有認為是始新世,有認為是中新世<sup>1)</sup>,根據我們鯢類的標本看來,筆者認為前種意見較為確切,其理由有:

1) *Tomistoma* 是鯢類進化上的一支分枝,它在系統位置上的關係與 *Crocodyles* 較近而與 *Gavialis* 稍遠,故現在大多數人把它歸入 *Crocodylidae* 科中。作為鯢類整個進化過程來說, *Gavialidae* 科和 *Crocodylidae* 科的分化是在白堊紀完成的<sup>2)</sup>。所以,如果如上所述茂名標本是代表一個介於 *Gavialis* 和 *Tomistoma* 兩屬之間的新屬的話,則其時代決不會更晚於始新世。

2) 在茂名鯢類的同一層位中,過去和這次都發現過大量屬於 *Anosteira* 屬的魚類化石,這鯢類的生活時代大多數是始新世,尤其是亞洲。

3) 從上述新種的上顳顬孔較大、側顳顬孔更大且其後緣水平線超出上顳顬孔後面很多等原始特徵看來,其時代是不會晚於始新世的。

此外,上述腦內模上所反映的原始性質,也可作為佐證。

## 參 考 文 獻

- [1] Mook, C. C., 1921: Skull characters of recent crocodilia, with notes on the affinities of the recent genera. Bull. Amer. Mus. Nat. His. Vol. 44, P. 128—151.
- [2] Mook, C. C., 1934: The evolution and classification of the crocodilia. Jour. Geol. Vol. XLII. P. 295—304.
- [3] Nopcsa, B., 1928: Palaeontological notes on reptiles. VII, on the classification of the crocodilia. Geologica Hungarica, Tom. I, Fasc. I, P. 75—84, Pl. IX.
- [4] Rand, H. W., 1950: The Chordates, P. 480.
- [5] Romer, A. S., 1955: The vertebrate body (second edition), P. 564—567.
- [6] Young, C. C., 1948: Fossil crocodiles in China, with notes on dinosaurian remains associated with the Kansu crocodiles. Bull. Geol. Soc. China. Vol. 28, P. 282—283.
- [7] Zittel, K. V., 1902: Text-book of Palaeontology, Vol. II, P. 217—222.

1) 參見古生物學報 3 卷 4 期 280 頁; 4 卷 2 期 233 頁; 古脊椎動物學報 1 卷 2 期 152 頁。

2) 據 Mook, C. C. 1934. "The Evolution and Classification of the Crocodilia".

## A NEW CROCODILES FROM MAOMING KWANGTUNG

YEH HSIANG-K'UEI

(Institute of Vertebrate Palaeontology, Academia Sinica)

### (Summary)

In August, 1958, Y. H. Li, F. C. Ch'ai and the author were sent by the Institute of Vertebrate Palaeontology to Maoming, Kwangtung for making additional studies of this site known to be with *Anosteira maomingensis* and *Cyprinus maomingensis* described by Chow (1955, 1956) and Liu (1957) respectively. In addition to a large number of turtles and fishes collected by us, an interesting cast of skull with remarkably well preserved brain part and an another isolated one were found. Because of these interesting finds, some observations on the structure of the brain cast and that of the skull which might be inferred from the cast are given in this note.

### *Tomistoma* Müller

#### *Tomistoma petrolica* Yeh, sp. nov.

Type.—A skull cast with anterior part missing, but the cast of the brain is well preserved. Cat. No. V 2303.

Paratype.—A broken brain cast with the cerebrum and optic lobe parts preserved only. Cat. No. V 2303a.

Horizon and locality.—Maoming Series, Uppermost Eocene; Tat'ang, Maoming, South-western Kwangtung.

Diagnosis.—Snout slender; nasals long and narrow, separated from premaxillaries and external narial aperture by maxillaries meeting dorsally in front of the nasals. Orbits large, ovally shaped, their longitudinal diameters greater than transverse. Space of two orbits narrow. Supratemporal fenestrae developed, oval in outline, length about half as that of orbit. Infratemporal fenestrae large, rectangular, and with their posterior border extending considerably behind that of the supratemporal fenestrae.

#### Remarks:

(1) Brain cast.—Except the olfactory tract and bulb the whole parts of the brain are exposed in type; the cerebrum, optic lobe, cerebellum and medulla are thus distinguishable. Because the preservation of our specimen is so fine that the nerves VII, VIII, XI, XII probably IV, V are observed in dorsal and side views; besides, we can also see several veins in ventral view.

The general form and structure of our specimen from Maoming resemble closely to the internal mould of the brain cast of *Alligator sinensis*, and this indicates that our specimen doubtlessly belongs to Crocodylidae. But there are evidently still some differences between them, such as: 1) the length ratio of cerebrum of our specimen is less than that of *Alligator*; 2) the whole brain of our specimen is rather flat, thus the end section of medulla is like a convex lens, while that of *Alligator* is sub-round; 3) the ventricle IV of our specimen is not conspicuous. All these characters probably indicate that our specimen may represent a primitive one of the eusuchian.

The size of the cerebrum of the paratype being larger than that of the type, it is considered as an adult and the type is a young individual.

(2) Skull cast.—The characters mentioned in the diagnosis give us an idea that the specimen here described must belong to longirostral crocodiles. The slender snout, long nasal, and the relative small size of the supratemporal fenestrae are characteristic of *Tomistoma*; however, in *Tomistoma* the nasals and the premaxillaries are generally in contact with each other, while in our specimen the nasals are separated from the premaxillaries by maxillaries, a feature characteristic of gavials. Therefore there is the possibility that the specimen from Maoming may represent a new genus; but the sutures of these bones on the skull cast are so doubtful that it seems reasonable to refer it temporarily to the genus *Tomistoma* with which it has so many characters in common. Thus the new specific name *Tomistoma petrolica* is proposed which indicates the fact that the specimens are found in the oil shale beds.

### 圖版 I 說明

#### Explanation of Plate I

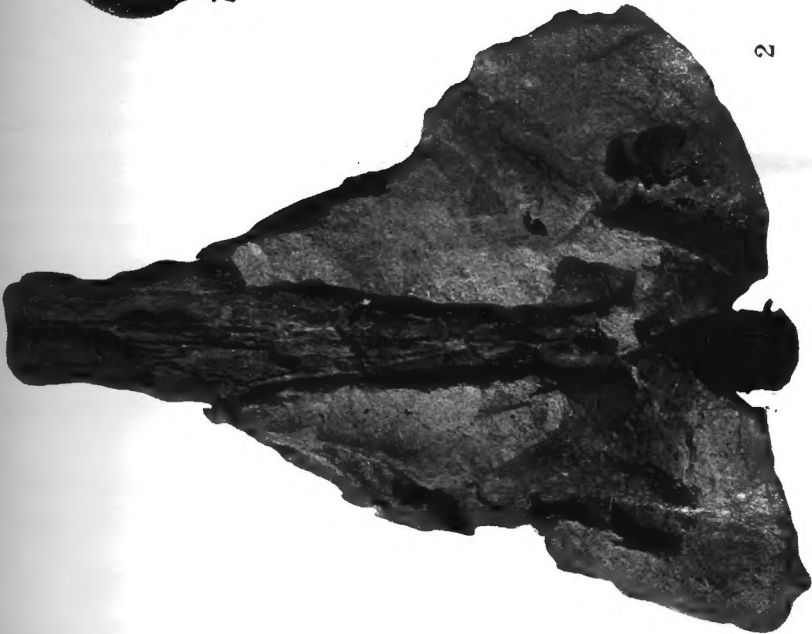
1. *Tomistoma petrolica* Yeh, sp. nov. 正型標本背面觀 (Dorsal view of type).  $\times 2/3$ , V2303.
2. *Tomistoma petrolica* Yeh, sp. nov. 正型標本腹面觀 (Ventral view of type).  $\times 2/3$ , V2303 a.
3. *Tomistoma petrolica* Yeh, sp. nov. 副型標本, 殘破的腦內模背面觀 (Paratype, incomplete brain cast in dorsal view).  $\times 2/3$ , V2303a.



1



3



2